NEW CONCEPT MAKES INTELLIGENT ELECTRICAL LOAD MANAGEMENT WIDELY APPLICABLE

Payoff

A new electric load management concept, using remote terminals (RT) like the one shown above and a solid state power controller (SSPC), has been selected by Bombardier Aerospace Group - North America for its long range, high-speed global express business jet and by Lockheed Aeronautical Systems Company for the advanced Hercules II, C-130J transport. The RT provides improved diagnostics that contribute to simplified maintenance, improved survivability and lower life-cycle costs. It also increases electrical system fault tolerance and reliability.

Accomplishment

The Propulsion Directorate's Aerospace Power Division has developed new, generic RTs that can be configured to manage any type of aircraft alternating current (AC) or direct current (DC) electrical system. The RT is the heart of an electrical load management system (ELMS) that

replaces the conventional circuit breaker/relay panel and provides the intelligence to perform automatic load control and built-in-test.

Background

The key technologies in implementing intelligent electric load management are the RT and the solid state power controller (SSPC). The ELMS distributes, controls, and monitors power to all aircraft loads and power busses, and functions as a utility management system for basic airplane subsystems. Once activated, the ELMS automatically performs all load management and electric bus switching control functions through its capability to continuously sense and monitor the health of the vehicle's electrical system. The ELMS is activated in a normal mode which contains flight, ground, and maintenance submodes. In case of an emergency (electrical failures), the ELMS automatically reconfigures the electrical busses, sheds loads if necessary, and simultaneously informs the crew as appropriate. The crew can react by either overriding the ELMS decisions or acknowledge the failure(s) and continuing the mission. These features reduce pilot burden and simplify maintenance procedures. On the C-130J this technology enabled the removal of one person (the flight engineer) from the cockpit which has resulted in a two-person flight crew. The SSPC is a solid state equivalent to a series fuse/relay (circuit breaker) combination that performs the load control (switching) on command from the RT or pilot while providing automatic short circuit protection to the wire and load. An advanced SSPC has demonstrated a six-fold improvement (130 amps, 270 volts DC versus 20 amps, 270 volts DC) over current SSPCs.